

MICHAEL FARADAY VIS-A-VIS CHANDRASEKHAR

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(Received 16 October 1998; after revision 22 April 1999)

The paper presents the personality and character of two great scientists namely Michael Faraday and S. Chandrasekar. Faraday suffered humiliation at the hands of his teacher Sir Humphry Davy, Professor at the Royal Institute in London (now known as Davy Faraday Laboratory) and so is Chandrasekhar, the Nobel Laureate who faced a lot of ordeals from Sir Arthur Eddington, a great and reputed astronomer and astrophysicist in U.K. Both showed great respect to their tormentors and uttered not a single disrespectful word inspite of humiliation, which made them lovable in the scientific society.

Key Words: Chandrasekhar, Davy, Eddington, Faraday

Sir Humphry Davy (1778-1829) was a Professor at the Royal Institute, London a well-known research institute in U.K. He selected Michael Faraday (1791-1829) as his junior collaborator. Michael Faraday did not have any basic university education but he is considered as a great experimental physicist, and his contributions are well-recognised and reported in all text books of physics and physical chemistry, electricity and electromagnetism.

After a few years of his service, for some reasons Davy became intolerant and unsympathetic to Faraday. But Faraday never protested or uttered a single word of disregard. When Faraday was elected to the fellowship of the Royal Society, London, - it was observed that there was only one black ball in the ballot box. People suspected it was from Davy though there was no positive proof. This incident however tarnished the reputation of Davy.

When Davy was old, some reporters approached to know about his important scientific discoveries. Davy replied:

- 1) Marsh Gas (now known as Methane)
- 2) Laughing Gas (now known as Nitrous oxide. Which is now-a-days used in surgical operations to make the patient unconscious)

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- 3) The alkali metals (Sodium, Potassium)
- 4) Safety Lamp, which is usually known as Davy's Safety Lamp (widely used by coal miners)
- 5) Finally, he said my greatest discovery is Michael Faraday.

After Davy, Faraday was appointed to his post. When Jean Andres Dumas, from France, came to visit the Royal Institute (which is now renamed as Davy-Faraday laboratory), while climbing up the stairs, Faraday told Dumas pointing to the portrait of Davy - "Look friend, this is the portrait of a great man."

Faraday's life was to some extent one of self-denial. He declined the offer of the Presidency of the Royal Society. After his demise, his countrymen arranged a lecture in his memory to be delivered by an eminent scientist every four years. It is known as the Faraday Memorial Lecture. The first lecture was delivered in 1869, by Dumas. In the context Dumas stated that when Davy visited Paris he took Faraday along with him. He said, "We respected Davy, but we loved Faraday". Einstein kept a picture of Faraday in his library room.

S. Chandrasekhar was born on the 10th October 1910. He had a good family background. He came from an upper middle-class family. His academic record in the Presidency College, Madras in Physics and Mathematics were commendable. He went to Cambridge with a scholarship. After he was admitted to the doctorate degree in Physics, he asked his research guide, Professor R.H. Fowler, whether he could be given a stipend so that he could continue his research work further at Cambridge. At that time there was not much opening in India. Professor R.H. Fowler discouraged him, he said that he found no opening, but advised him to try for a fellowship at the Trinity College, but also cautioned him, that there are some doubts if he could succeed in the first chance. Chandrasekhar took the challenge and appeared at the examination according to the rules of Trinity College. One fine morning he saw his name in the list of successful candidates. At that time Sir J.J. Thomson was the Master of the Trinity College. Chandrasekhar got the certificate from the hands of Sir J.J. Thomson (who also became a fellow of the Trinity college in the first chance), It may be mentioned that Fellowship of the Trinity College, is a prestigious appointment. Those who are offered the Fellowship of the Trinity College achieve a great scientific career like a fellowship of the Royal Society or a Nobel Laureateship. It will not be out of place to state that S.Ramanujan was the first Indian, before Chandrasekhar, to be elected to the Trinity fellowship.

After his brilliant achievement, Chandrasekhar had to face ordeals from no less a person than Sir Arthur Eddington. Eddington had a great reputation in U.K. as an astronomer and astrophysicist. He was famous for his expedition to Africa to verify the predictions of Albert Einstein. Einstein's reasoning was that the Sun, because of its massive body has got

a high gravitational force. Light has got dual property of wave and corpuscular. Because of the corpuscular nature of light, when the light rays from a distant star will come near the Sun, the light particles will be attracted by the Sun, and its path will be bent before reaching the surface of the Earth. Einstein's views could be verified only during a total solar eclipse. One total solar eclipse took place in 1919, but it was visible only from West Africa and Brazil. Eddington and his associates took photographs during the solar eclipse and found that what Einstein predicted was true and it is true still. Einstein became famous and Eddington was respected as a great astrophysicist and was revered as he was one of the few persons who could understand the theory of relativity in the early twenties.

When Chandrasekhar put his views in what is now known as the Chandrasekhar Limit, in a learned society in London, he was openly ridiculed by Eddington, who used strong language, occasionally cut jokes at his cost, so that the whole audience roared into laughter. Chandrasekhar was then quite young. He returned to Cambridge in a sad state of mind. He sat down quietly for some time. He was a man of strong nerves. He only murmured, 'Life is like that'. He was not cowed down by the remarks of Eddington. He knew that stalwarts also make mistakes. Then he decided his future course of action. He argued to himself that if he continues to stay further in U.K. his research work will be hampered and his time will be wasted in squabbles with Eddington. He thought it will be better if he goes to some other country. He got an offer from the University of Chicago, and there he emerged as a great astrophysicist. Chandrasekhar had sterling qualities, which would impress anybody. Though he received harsh treatment at the hands of Eddington at the beginning of his career, he did not maintain any grudge against Eddington. For him tolerance was a sign of strength and not of weakness. He remained unperturbed by these disturbances. He did not lose the balance of mind, by which he knew that he will be doing more harm than good to himself. He felt that he should have a *locus standi*. He left England, went to Chicago. He took all incidents in a sporting spirit, and considered them as a 'part and parcel of life' and shook them off. He used to send Eddington food packets during the war years, besides the Christmas presents. He had some sort of magnanimity in him. In 1944, one great scientist of U.K. in a discussion with Eddington, asked him what about Chandrasekhar's election to the Royal Society. Eddington's answer was in the affirmative.

In this respect, Chandrasekhar had some similarity with Michael Faraday though he belonged to a later generation. Davy did not treat Faraday properly. Neither Faraday uttered a disrespectful word to Davy, nor did Chandrasekhar had any disrespectful utterance against Eddington.

Chandrasekhar had the unique distinction of being the only Indian Scientist, who won the triple crown of being a fellow of the Trinity College, a fellow of the Royal Society, and last but not the least a Nobel Prize awardee in 1983, which he came to know on the 10th October 1983. He took it rather lightly and did not get excited - simply told it was a birthday gift.

Victor Weiskoff remarked about Chandrasekhar "He is the most positive human being I have met in life as a scientist. He has that untouchable integrity which is so impressive".

In his personal life, he was neatly dressed, soft spoken and did not have any pride. For him, the adage 'Humility is greater than pride' amply holds good. He had some sort of equanimity in him, and was calm and serene and was unruffled in tense circumstances. He was a very popular teacher in the Chicago University, revered by all the students and his colleagues. He was a nephew of Sir C.V. Raman and it is a unique incident in the history of science in India, that from the same family two members won this highest award in science.

There is hardly any laurel in the field of astrophysics in the international field that was not showered on him. He was elected to the learned societies of our country and delivered prestigious memorial lectures. For some reasons he took American citizenship, but that did not prevent him to receive 'Padma Vibhushan' from the Government of India.

He was invited to deliver the Eddington Centenary Memorial Lecture. He spoke in eloquent terms about Eddington's scientific contribution and the qualities of his head and heart. Chandrasekhar passed away in 1995-the end of a very eventful yet a very successful life.

REFERENCES

- Chandrasekhar, S. *Albert Einstein*, Indian National Science Academy, 1984.
- Dumas, Jean Andres. *Faraday Memorial Lecture*, Chemical Society, London
- Frank Ashall, *Remarkable Discoveries*, Foundation Books, (Indian edition) New Delhi, 1994.
- Jagjit Singh, *Space Time Waltz*, Wiley Eastern Limited, New Delhi, 1995.
- Kaneshwar Ali, Chandra, *Chandra*, Central News Agency (P) Limited. Penguin Books India (P) Ltd., 1991.
- Venkataraman, G. *Chandrasekhar and his Limit*. University Press (India) Private Limited, 1992.

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